ATOP-R&D

Human Factors Newsletter # 04-24

November 27, 2004 – December 10, 2004

Technical Note: Sollenberger, R. L. and Della Rocco, P. S. (2004). Human Factors Issues in the Collocation of URET, TMA, and CPDLC. Proceedings of the 23rd Digital Avionics Systems Conference. Salt Lake City, UT: IEEE/AIAA.

Abstract. The Federal Aviation Administration (FAA) Free Flight Program individually deployed the User Request Evaluation Tool (URET), Traffic Management Advisor (TMA), and Controller-Pilot Data Link Communications (CPDLC) to a limited number of Air Route Traffic Control Centers (ARTCCs). Before deployment expands nationwide, it was important to identify any potential human factors issues that may arise due to the collocation of these tools at the controller's workstation. In this paper, we present the results of a high fidelity human-in-the-loop simulation we conducted to evaluate the impact of URET, TMA, and CPDLC collocation on air traffic controllers. We examined collocation issues with a "stovepipe" independent configuration where none of the tools were integrated or directly communicated with each other. Twelve certified professional controllers participated in the simulation working in two-person teams consisting of a Radar (R-side) and Data (D-side) controller. The most important collocation issue identified was that controllers had difficulty accessing important information on the D-side display when URET and CPDLC were both operational (i.e., display clutter). Although neither tool alone caused display clutter, both tools in combination made it difficult for D-side controllers to find the information they needed quickly. This was especially true for accessing CPDLC windows, which became covered when controllers used URET. Good human factors design principles prescribe that users must have immediate access to important information and that critical information should never be covered. A "stovepipe" independent deployment of these tools will result in impaired access to timely information. The results of this study indicated that better efforts should be made to integrate the information from URET, TMA, and CPDLC on the D-side monitor prior to deployment of all three tools at the controller's workstation.

Point of Contact: R. Sollenberger, WJHTC

Technical Note: Willems, B. (2004). Future En Route Air Traffic Control Workstation: Back to Basics. In *Proceedings of the 23rd AIAA/IEEE Digital Avionics Systems Conference* (pp. 5.A.3.1-12). Piscataway, NJ

Abstract. The expected increase in air traffic (at least 33%) by the 2015/2020 timeframe will require more than an evolutionary change in the way air traffic controllers work. One way to do this is to free up individual air traffic controller physical and mental resources. If controllers can apply the increase in available resources to air traffic control, we expect that they will have more capacity to absorb an increase in air traffic. To make these resources available, we will use human factors principles to integrate available data and provide that data to controllers in an efficient presentation format. We report on the development of a concept software platform that integrates data obtained from existing automation tools with available National Airspace System (NAS) data. The integration takes place at the human computer interface and attempts to make that interface easy to use by applying human factors principles and leveraging existing air traffic controller expertise. We will discuss why we must present NAS data in an integrated manner. We will also present how we intend to assess success in our approach to freeing individual air traffic controller resources. FP Capacity Obj 3 POC Ben Willems and

Point of Contact: B. Willems, WJHTC

Technical Note: *Improving the Usability of an Automated Tool for the Recording, Coordination and Communication of Traffic Management Initiatives.* Bart Brickman, Northrop Grumman Information Technology, Dayton, OH; Tanya Yuditsky, Federal Aviation Administration, Atlantic City International Airport, NJ, USA

Abstract: The current processes for recording, coordinating, and communicating traffic management initiatives in Air Traffic Control (ATC) are inefficient, workload intensive, and time consuming. The National Traffic Management Log (NTML) is an automated tool that will enhance and streamline these processes. The researchers used an iterative design methodology with a multidisciplinary design team to develop solutions to existing design problems, and to design new system capabilities. The design team included human factors specialists, hardware and software engineers, and ATC domain experts. The design challenges faced by the team included addressing the unique needs of the various ATC domains while providing a usable human-computer interface. The application of the iterative design methodology and the benefits of using a multidisciplinary design team are discussed.

Point of Contact: T. Yuditsky, WJHTC

Note: The Technical Notes above support the Administrator's Flight Plan Goal for Increased Safety, Objective 7: Enhance the safety of FAA's air traffic systems. They also support the Administrator's Flight Plan Goal for Greater Capacity, Objective One: Increase capacity to meet projected demand.

ASRS: On November 22-23, William Knecht (CAMI) traveled to NASA Ames Research Center to meet with staff of the Aviation Safety Reporting System (ASRS). System Safety (ASY-300) is sponsoring beta-testing of a weather incident questionnaire for ASRS. A multi-divisional effort is underway to explore automated, web-based data collection, using this questionnaire as a prototype. Nelda Milburn (CAMI) met with the ASRS staff to better understand the ASRS database and to learn how queries and searches are performed. The ASRS database will be used to identify incidents in which the use of color in advanced aviation displays or color-coding in the aviation environment contributed to an incident. That information will be used to identify some applications of color-coding that may be misinterpreted. This research supports the Administrator's Flight Plan Goal for Increased Safety, Objectives One and Seven: Reduce the commercial fatal accident rate; Enhance the safety of FAA's air traffic systems. (T. McCloy, ATOP-R&D)

ETMS: William J. Hughes Technical Center researcher Tanya Yuditsky traveled to the Volpe National Transportation Systems Center to view a demonstration of new capabilities that are in development for the Enhanced Traffic Management System (ETMS). Several representatives from the Traffic Management User Team (TUT) also attended the demonstration. Attendees evaluated implementation of the new capabilities against human factors design guidelines and best practices, and solicited feedback from the TUT on system usability. In coming months, Technical Center personnel will work with the TUT and Volpe software engineers to refine system requirements for future releases of the ETMS. This research supports the Administrator's Flight Plan Goal for Greater Capacity, Objective Three: Increase the on-time performance of scheduled carriers. (T. Yuditsky, WJHTC)

Laboratory Visit: Mr. Norm Fujisaki, ATO Vice President for Operations Planning visited the William J. Hughes Technical Center's Research and Development Human Factors Laboratory. He received briefings on virtual reality, collocation research and the future en route workstation. (E. Stein, WJHTC)

Human Performance: The William J. Hughes Technical Center is providing consulting services to Dr. William Bramble, National Transportation Safety Board, during his research into the issues surrounding a recent runway incursion at Los Angeles (LAX). Dr. Bramble is interested in Technical Center material related to human memory and the implications for working memory of the position relief briefing and transfer of control from outgoing to incoming controllers as they take over a position. To date, he has received Technical Center publications related to memory and memory lapses. (E. Stein, WJHTC)

Operational Errors: The November 2004 ICAO Journal includes an article on the close collaboration between human factors researchers in the United States and Europe that is leading to a better technique for identifying and understanding the causal factors behind human error in ATM operations. For more information, point to http://www.icao.int/icao/en/jr/jr.cfm
Note: ICAO uses a special software application called *deja vu* for viewing their Journal. The download is simple to follow. The article is in Number 8, November 2004, starting on page 16. (P. Krois, ATOP-R&D)

More information on human factors research can be found at the FAA Human Factors (ATOP-R&D) web site: http://www.hf.faa.gov

Mark D. Rodgers
FAA (ATOP-R&D)

January 9-12, 2005 – International Conference on Intelligent User Interfaces, San Diego, CA http://www.catamaranresort.com/

January 9-13, 2005 – TRB 84th Annual Meeting, Washington, DC http://trb.org/calendar/

January 10-13, 2005 - 43rd AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV http://www.aiaa.org/

January 19-21, 2005 – Air Cargo Symposium, Ritz-Carlton New Orleans, New Orleans, LA http://www.aci-na.org

January 25-27, 2005 – AE-2 Aerospace Lighting Committee Meeting, New Orleans, LA elizd@sae.org

January 28, 2005 – Deadline for papers - 6th USA/Europe ATM Seminar, Baltimore, MD, June 2005 http://atmseminar.eurocontrol.fr/

February 1-3, 2005 - ATC Maastricht (EUROCONTROL), Maastricht, Netherlands http://www.atcmaastricht.com/

February 9-11, 2005 – 6th Annual Aviation Security Summit Expo, US Grant Hotel, San Diego, CA http://www.worldrg.com/AW500/wrg.asp

February 16-17, 2005 – World Aerospace Symposium, Pierre Baudis Toulouse Congress Center, Toulouse, France http://www.aviationweek.com/conferences/meu_e3.htm

March 6-8, 2005 – Air Cargo 2005, Hotel del Coronado, San Diego, CA http://www.aircargoconference.com

March 17-18, 2005 – Aviation and Environment Summit, Crowne Plaza, Geneva, Switzerland http://www.iata.org

April 2-7, 2005 – CHI 2005, Portland, OR *chi2005-chair@acm.org*.

April 5-7, 2005 – Aviation Testing Expo 2005: Scientific Conference and Technology Forum, Europe, Messe Hamburg, Germany http://www.aerospacetesting-expo.com/northamerica/conf+forum.html

April 11-15, 2005 – SAE 100th Anniversary World Congress, Cobo Hall, Detroit, MI *http://www.sae.org/congress/about/news/congressdates.htm*

April 12-18, 2005 – Sun 'n Fun 2005, Lakeland, FL http://www.sun-n-fun.org/

April 17-22, 2005 – International Federation of Air Traffic Controller's Associations, Melbourne, Australia *http://www.ifatca.org/conferences/annual_conference.htm*

April 18-21, 2005 – 13th International Symposium on Aviation Psychology (ISAP), Civil Aerospace Medical Institute (CAMI), Oklahoma City, OK http://www.cami.jccbi.gov/, http://www.wright.edu/isap/

April 28-29, 2005- Mini-Conference on Human Factors in Complex Sociotechnical Systems, hosted by HFES South Jersey Chapter, Atlantic City, NJ, http://www.sjhfes.org/

May 9-12, 2005 - 76th Annual Scientific Meeting of the Aerospace Medical Association, Kansas City, MO *http://www.asma.org/*

May 26-29, 2005 – American Psychological Society 17th Annual Convention, Westin Century Plaza Hotel, Los Angeles, CA http://www.psychologicalscience.org/convention/

June 2005 – 6th USA/Europe ATM Seminar, Baltimore, MD (note: call for papers deadline is January 28, 2005) http://atmseminar.eurocontrol.fr/

June 13-19, 2005 - Paris Air Show 2005, Parc des expositions de Paris Nord - Le Bourget, 93350, France. www.paris-air-show.com

June 20-22, 2005 – 3rd Human System Integration Symposium, Sheraton National Hotel, Arlington, VA http://www.navalengineers.org/Events/HSIS2005/HSIS05Index.html

July 22-28, 2005 – HCI International 2005, 11th International Conference on Human-Computer Interaction, Caesars Palace, Las Vegas, NV hcii2005@ecn.purdue.edu

July 25-31, 2005 – EAA AirVenture Oshkosh 2005, Oshkosh, WI http://www.airventure.org

August 15-18, 2005 - 43rd AIAA Aerospace Sciences Meeting and Exhibit, Hyatt Regency San Francisco at Embarcadero Center, San Francisco, CA http://www.aiaa.org/

August 18-21, 2005 - 113th Convention of the American Psychological Association, Wash, DC http://www.apa.org/convention

September 12-16, 2005 – Interact 2005, Tenth IFIP TC13 International Conference on Human-Computer Interaction, Rome, Italy http://www.interact2005.org/

September 19-23, 2005 – ANA 2005 Aviation Conference and Exhibition, Connecticut Convention Center, Hartford. CN *http://www.aerospace-na.com/ace2005.asp*

September 25-28, 2005 - 11th Ka and Broadband Communications Conference and 23rd AIAA International Communications Satellite Systems Conference 2005 (organized by IIC), Aurelia Convention Center, Rome, Italy http://www.aiaa.org/

September 26-28, 2005 - AIAA 5th Aviation, Technology, Integration, and Operations Forum (ATIO), Hyatt Regency Crystal City, Arlington, VA http://www.aiaa.org/

September 26-28, 2005 - AIAA 2nd Intelligent Systems Conference (IS), Hyatt Regency Crystal City, Arlington, VA http://www.aiaa.org/

September 26-30, 2005 – Human Factors and Ergonomics Society 49th Annual Meeting, Royal Pacific Resort at Universal Orlando, Orlando, FL *http://hfes.org/meetings/menu.html*

October 3-6, 2005 – SAE 2005 AeroTech Congress and Exhibition, Gaylord Texan Resort and Convention Center, Dallas/Fort Worth Airport Area, Texas *http://www.sae.org/events/conferences/aerospace/*

October 6-9, 2005 – Aviation North Expo Conference, Fairbanks Princess Riverside Lodge, Fairbanks, AK *www.AviationNorth.org*

October 24-25, 2005 – National Academies Institute of Medicine Annual Meeting, National Academy of Sciences, Washington, *DC http://wwwsearch.nationalacademies.org/*

October 30—November 3, 2005 – 24th Digital Avionics Systems Conference, Hyatt Regency Crystal City, Wash., DC http://www.dasconline.org

November 6-9, 2005 - ACI World / Pacific Conference and Exhibition, Auckland, New Zealand. www.auckland-airport.co.nz

November 8-10, 2005 – Aerospace Testing Expo, North America: Scientific Conference and Technology Forum, Long Beach Convention Center, Long Beach, CA http://www.aerospacetesting-expo.com/northamerica/conf+forum.html

January 9-12, 2006 - 44th AIAA Aerospace Sciences Meeting and Exhibit, Reno Hilton, Reno, NV http://www.aiaa.org/

January 22-26, 2006 – TRB 85th Annual Meeting, Washington, DC http://trb.org/calendar/

Note: Calendar events in Italics are new since the last Newsletter

Comments or questions regarding this newsletter?
Please contact Bill Berger at (334) 271-2928
or via e-mail at bill.ctr.berger @faa.gov

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